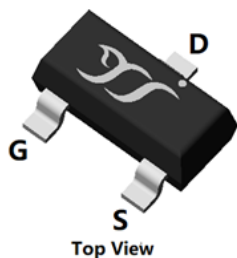
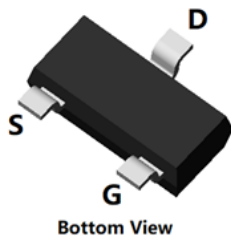




N-Channel Enhancement Mode Field Effect Transistor

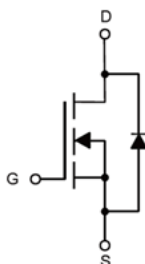


Top View



Bottom View

SOT-23



Product Summary

• V_{DS}	20V
• I_D	4A
• $R_{DS(ON)}$ (at $V_{GS}=4.5V$)	$<33m\Omega$
• $R_{DS(ON)}$ (at $V_{GS}=2.5V$)	$<49m\Omega$

General Description

- High density cell design for Low $R_{DS(ON)}$
- High Speed switching
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- PWM applications
- Power management
- Load switch

Limiting Values

Parameter	Conditions		Symbol	Min	Max	Unit
Drain-source Voltage			V _{DS}	-	20	V
Gate-source Voltage			V _{GS}	-12	12	
Continuous Drain Current (Note 1,2)	Steady-State	T _A =25°C,V _{GS} = 10V	I _D	-	4	A
		T _A =100°C,V _{GS} = 10V		-	2.5	
Pulsed Drain Current	T _A =25°C,t _p ≤10μs		I _{DM}	-	32	
Maximum Body-Diode Continuous Current	T _A =25°C		I _S		1.1	
Total Power Dissipation (Note 1,2)	Steady-State	T _A =25°C	P _D	-	0.97	W
		T _A =100°C		-	0.39	
Junction and Storage Temperature Range			T _J , T _{STG}	-55	150	°C

Thermal Resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA}$	-	128	$^{\circ}C/W$

Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJL033N02AJ	F2	03302.	3000	30000	120000	7" reel



■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A, T_j=25^{\circ}C$	20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V, T_j=25^{\circ}C$	-	-	1	μA
		$V_{DS}=20V, V_{GS}=0V, T_j=150^{\circ}C$	-	-	100	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V, T_j=25^{\circ}C$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A, T_j=25^{\circ}C$	0.45	0.65	0.90	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=4A, T_j=25^{\circ}C$	-	27	33	m Ω
		$V_{GS}=2.5V, I_D=2A, T_j=25^{\circ}C$	-	35	53	m Ω
Diode Forward Voltage	V_{SD}	$I_S=1A, V_{GS}=0V, T_j=25^{\circ}C$	-	0.7	1.2	V
Gate Resistance	R_G	$f=1MHz, T_j=25^{\circ}C$	-	9.7	-	Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=10V, V_{GS}=0V, f=1MHz, T_j=25^{\circ}C$	-	180	-	μF
Output Capacitance	C_{oss}		-	29	-	
Reverse Transfer Capacitance	C_{rss}		-	26	-	
Switching Parameters						
Total Gate Charge	Q_g	$V_{GS}=4.5V, V_{DS}=10V, I_D=4A, T_j=25^{\circ}C$	-	2.5	-	nC
Gate-Source Charge	Q_{gs}		-	0.5	-	
Gate-Drain Charge	Q_{gd}		-	0.6	-	
Reverse Recovery Charge	Q_{rr}	$I_F=4A, di/dt=100A/\mu s, V_{GS}=0V, V_R=10V, T_j=25^{\circ}C$	-	10.6	-	nC
Reverse Recovery Time	t_{rr}		-	3	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=4.5V, V_{DS}=10V, I_D=4A, R_L=2.5\Omega, R_{GEN}=3\Omega, T_j=25^{\circ}C$	-	4.9	-	ns
Turn-on Rise Time	t_r		-	13	-	
Turn-off Delay Time	$t_{D(off)}$		-	18	-	
Turn-off Fall Time	t_f		-	13	-	

Note:

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. The value of $R_{\theta JA}$ is measured with the device mounted on the 40mm*40mm*1.1mm single layer FR-4 PCB board with 1 in² pad of 2oz. Copper, in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of $150^\circ C$. The value in any given application depends on the user's specific board design.
3. Thermal resistance from junction to soldering point (on the exposed drain pad).

■ Typical Electrical and Thermal Characteristics Diagrams

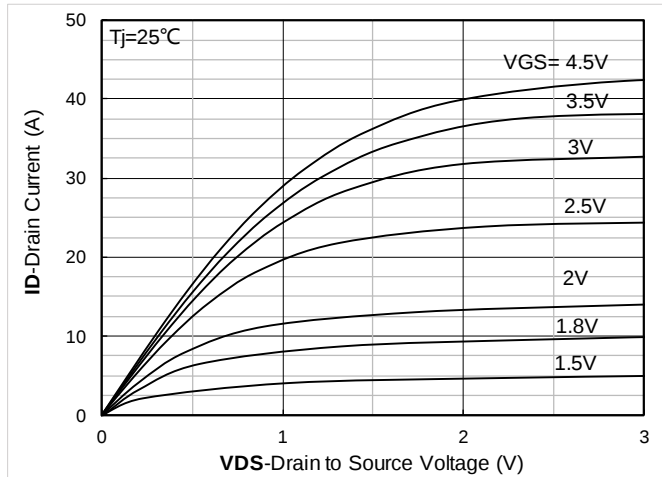


Figure 1. Output Characteristics; typical values

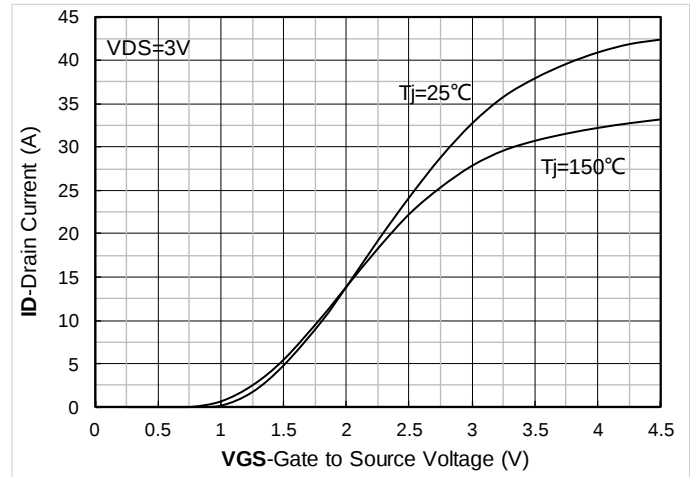


Figure 2. Transfer Characteristics; typical values

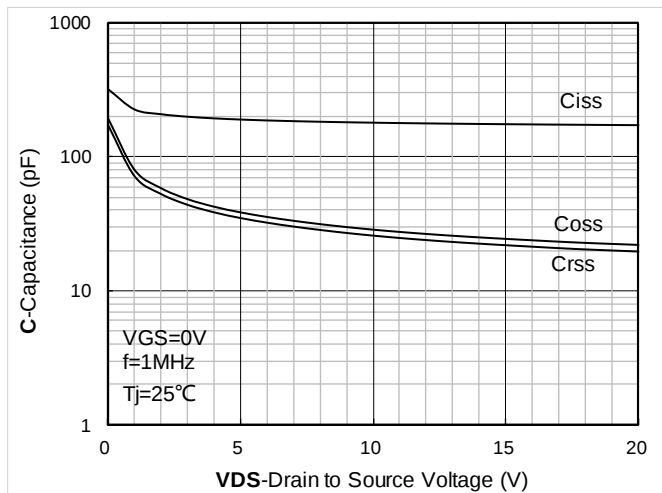


Figure 3. Capacitance Characteristics; typical values

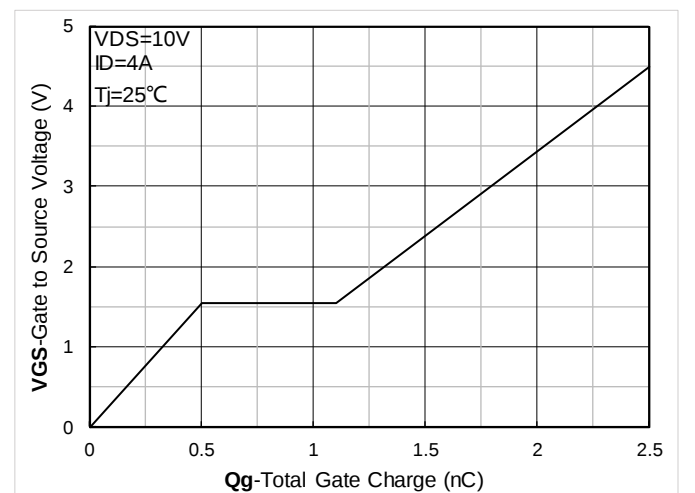


Figure 4. Gate Charge; typical values

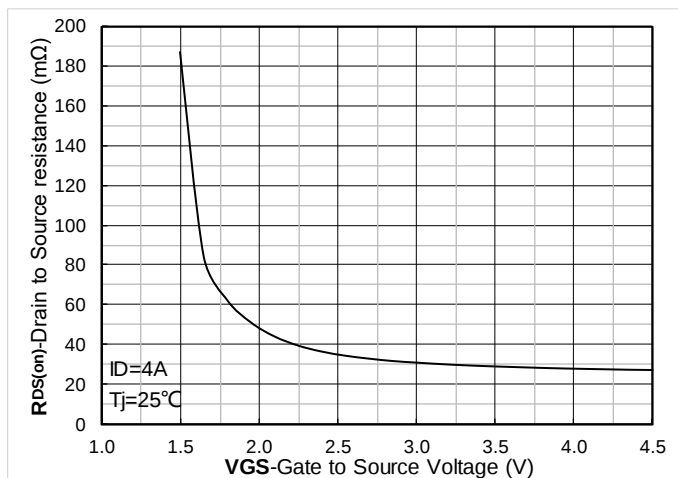


Figure 5. On-Resistance vs Gate to Source Voltage; typical values

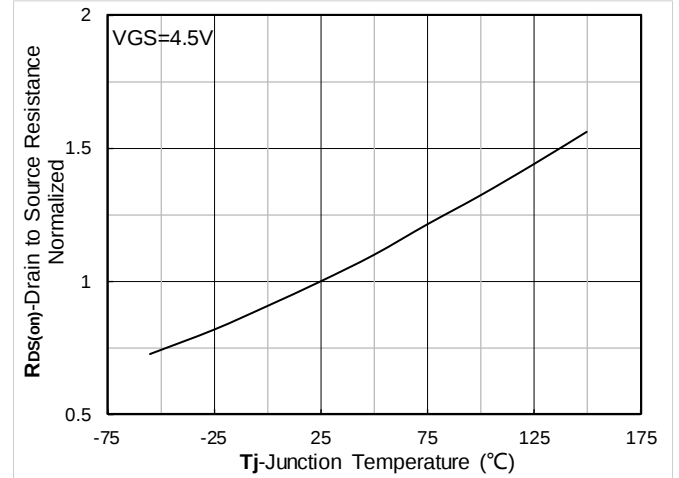


Figure 6. Normalized On-Resistance

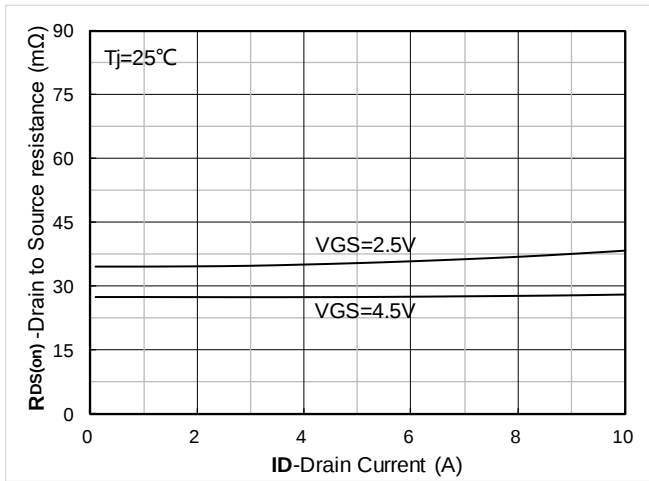


Figure 7. $R_{DS(on)}$ VS Drain Current; typical values

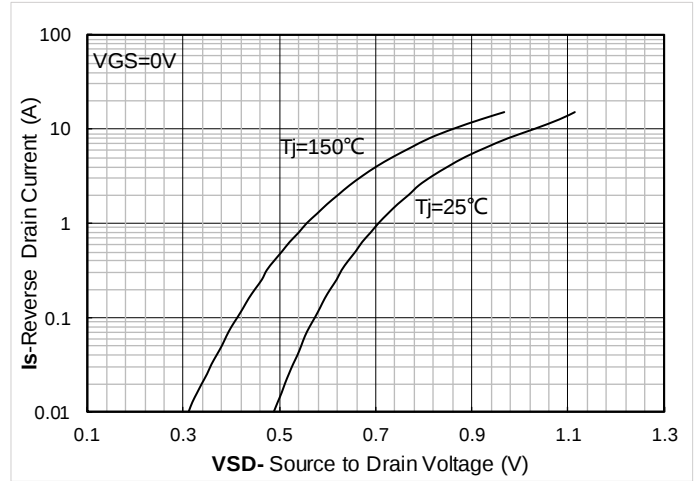


Figure 8. Forward characteristics of reverse diode; typical values

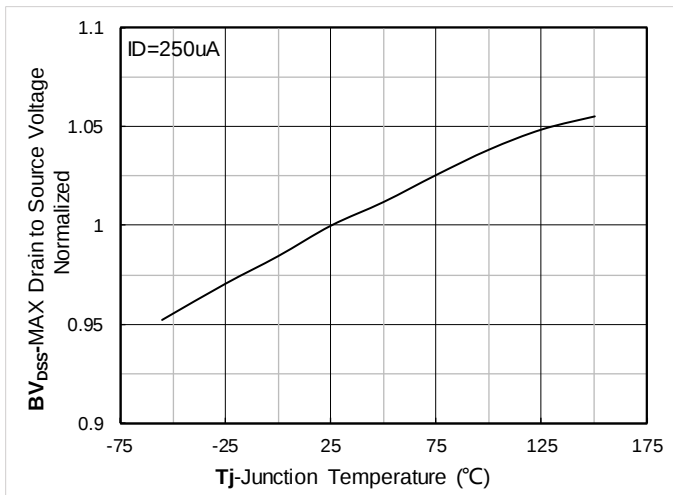


Figure 9. Normalized breakdown voltage

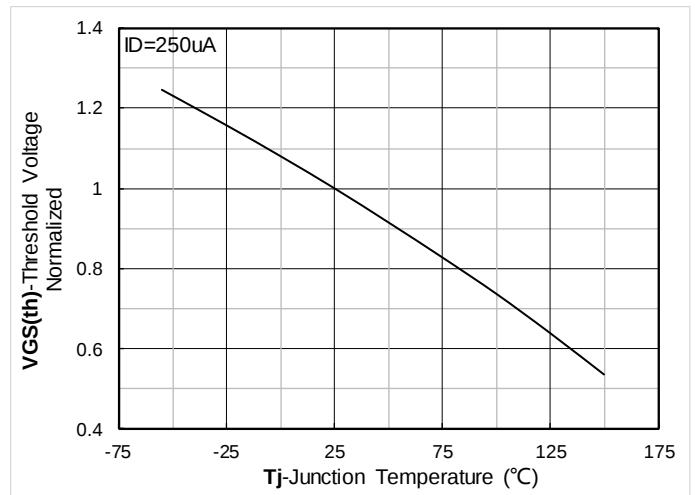


Figure 10. Normalized Threshold voltage

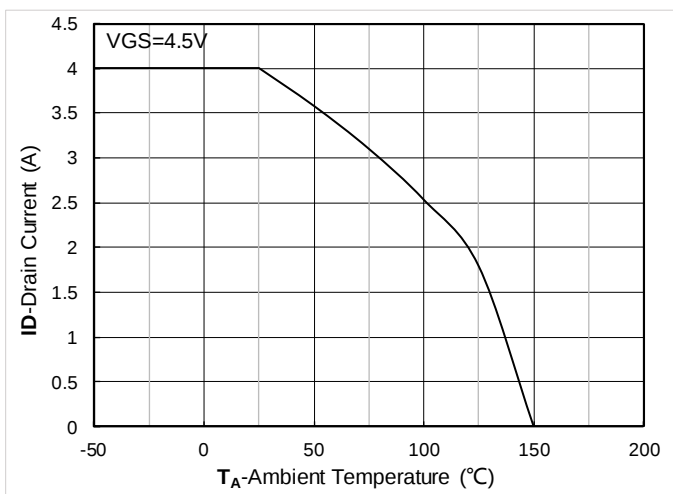


Figure 11. Current dissipation

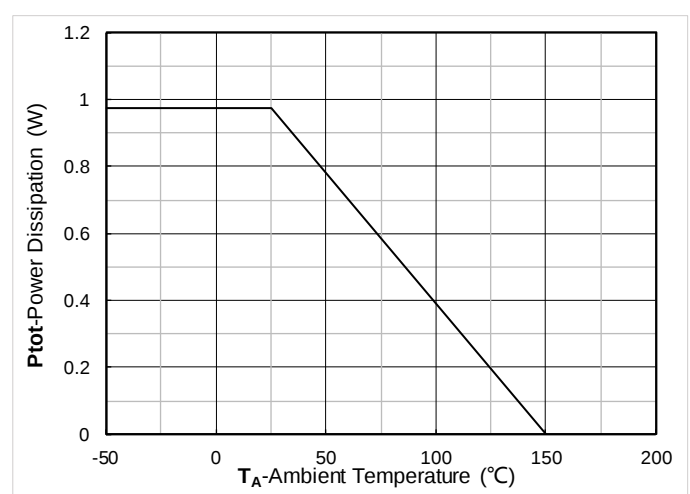


Figure 12. Power dissipation

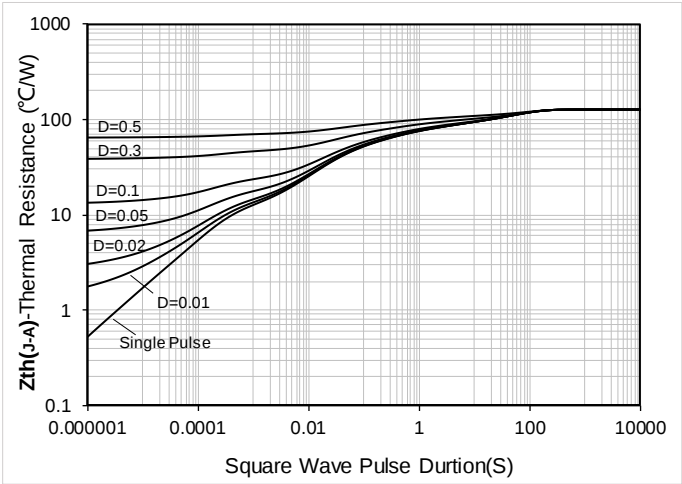


Figure 13. Maximum Transient Thermal Impedance

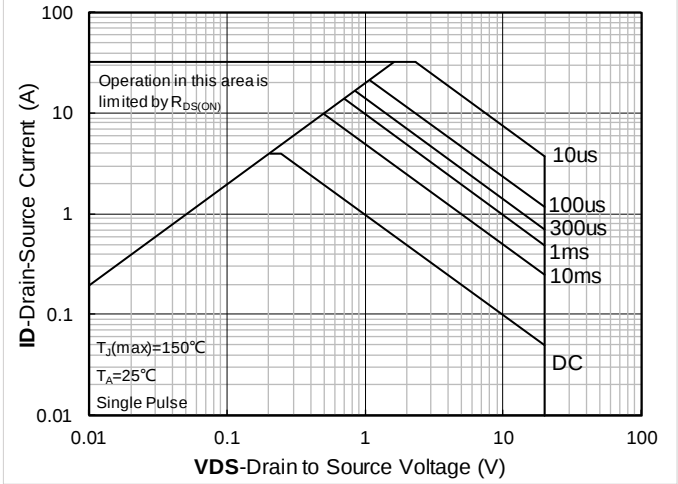


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

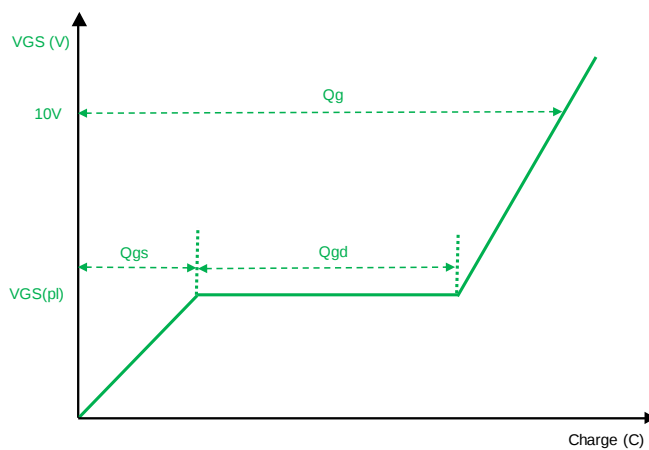
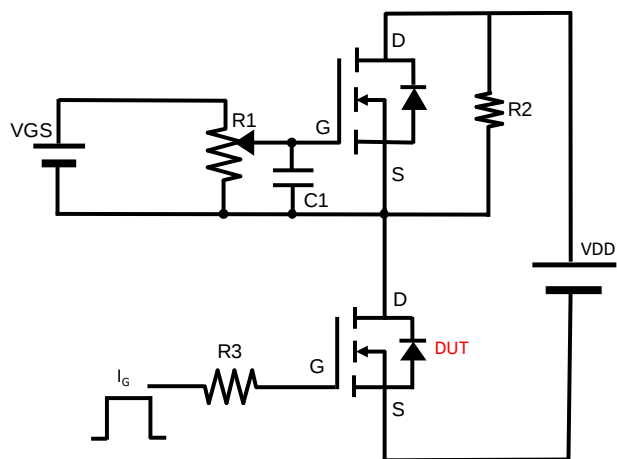


Figure A. Gate Charge Test Circuit & Waveform

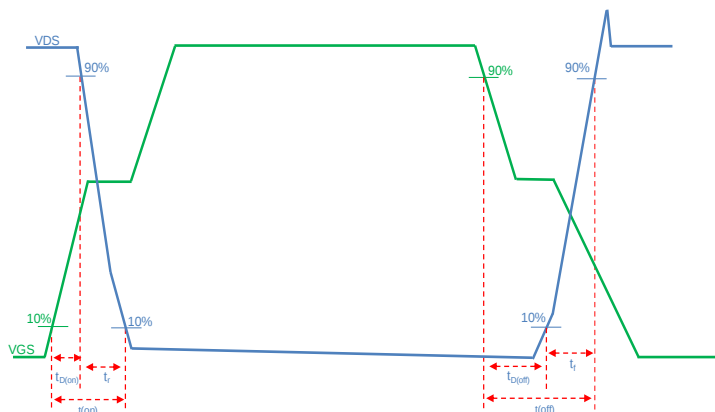
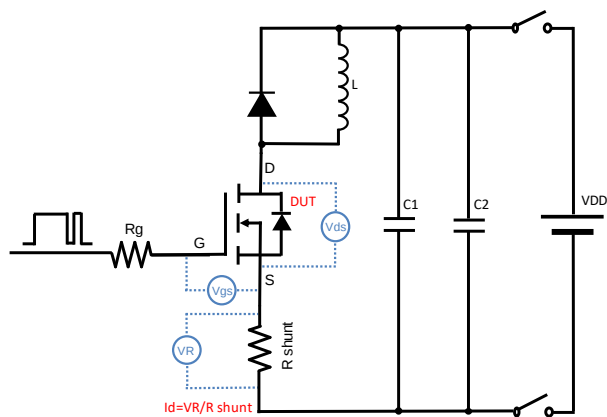


Figure B. Resistive Switching Test Circuit & Waveform

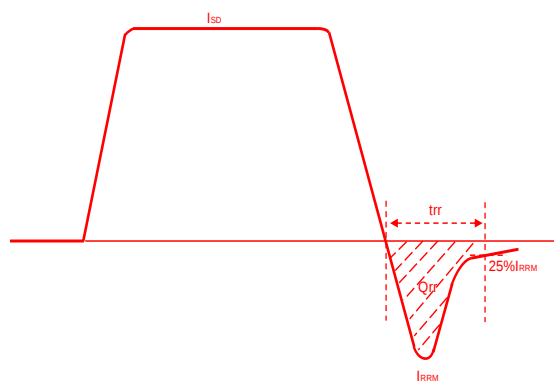
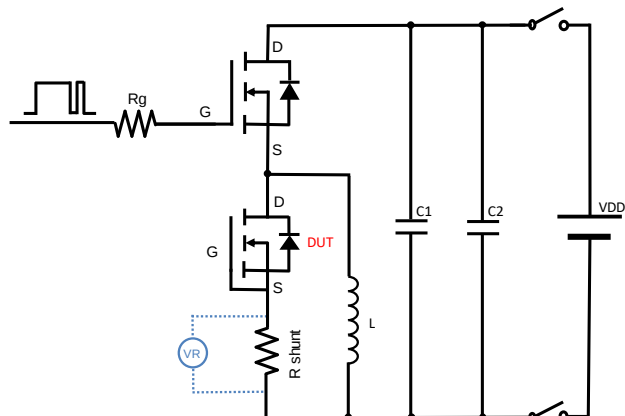
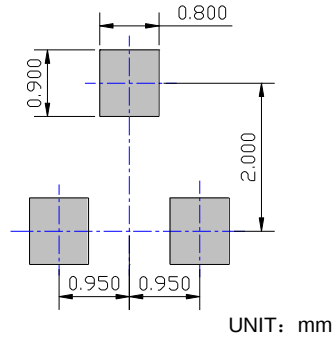
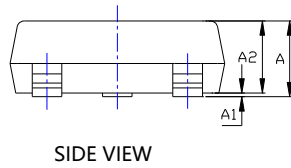
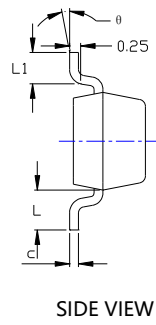
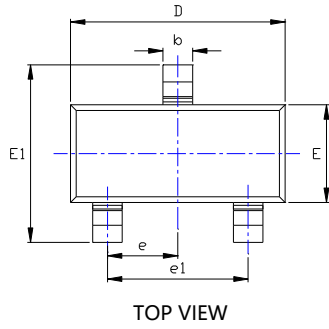


Figure C. Diode Recovery Test Circuit & Waveform

■ SOT-23 Package information

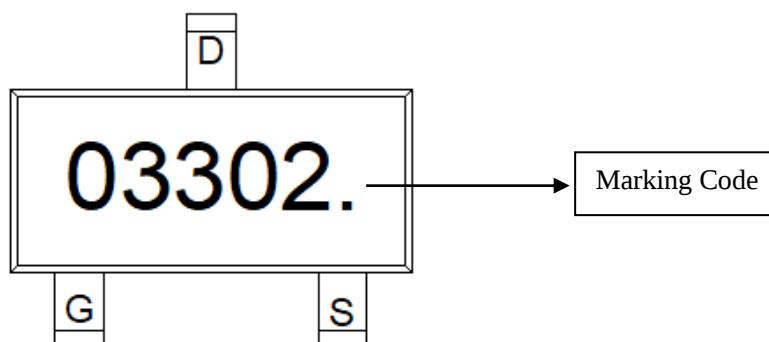


SUGGESTED SOLDER PAD LAYOUT

SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.035	0.045	0.900	1.150
A1	0.000	0.004	0.000	0.100
A2	0.035	0.041	0.900	1.050
b	0.012	0.020	0.300	0.500
c	0.004	0.008	0.100	0.200
D	0.110	0.118	2.800	3.000
E	0.047	0.055	1.200	1.400
E1	0.089	0.100	2.250	2.550
e	0.037TYP		0.950TYP	
e1	0.071	0.079	1.800	2.000
L	0.022REF		0.550REF	
L1	0.012	0.020	0.300	0.500
θ	0°	8°	0°	8°

NOTE:
 1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
 2. TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
 3. THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.

■Marking



Note:

1. All marking is at middle of the product body
2. All marking is in laser printing
3. 03302. is Marking Code
4. Body color: Black



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